Barrie, Ontario

The Challenge

The City of Barrie is located in a snow belt, receiving an average snowfall of 238 cm, more than twice that of other Ontario cities. Each snow event triggers a significant spike in calls to the City from residents who want to know how to clear the snow from the ends of their driveways (called a "windrow") when they are unable to do it themselves.

While snow removal from roads is a municipal service, clearing snow from a residential property is usually the responsibility of the property owner. However, for a variety of reasons (including health), snow removal is not an activity that some residents can perform. The best the City could recommend was for such residents to contact neighbours for assistance or hire a private snow removal company.

City staff did investigate programs offered in other jurisdictions, but none of these models were applicable to Barrie, either because of their high cost or the liability to which they might expose the municipality in cases of injury or accident. Instead, the City sought out a solution through challenge-based procurement.

It issued a Request for Proposals (RFP) from third parties who could offer a solution to the challenge: "How might the City of Barrie connect Seniors and Persons with Disabilities with an innovative service model for clearing of residential windrows during the winter season?" The RFP was awarded to Simalam Inc., creators of Snow Angels London. Collaborating with the City of Barrie expanded the platform to become Snow Angels Canada, available to Barrie residents and anyone across Canada.

The City of Barrie (above) is a dynamic waterfront community located on beautiful Kempenfelt Bay, 90 km north of the Greater Toronto Area. Home to 148,000 people, Barrie offers an excellent lifestyle and a multitude of recreational opportunities.

Simalam

Simalam Inc., a user experience and web development firm based in London, Ontario created the pilot platform Snow Angels London in 2015, as a catalyst for community volunteerism, connecting volunteers to residents in need of snow removal assistance at a neighbourhood level.

In December 2019, the City of Barrie and Simalam Inc. started by ensuring that the development of the Snow Angels Canada platform reflected the voice of user groups. The City connected Simalam Inc. to three sets of strategic stakeholders - clients, volunteers, and front-line City staff - to carry out focus groups. Their feedback was integrated into the platform for launch and helped to frame out a phased approach for future improvements. The involvement of user groups in the design and testing period also enabled new program clients to be identified: residents with temporary needs for snow removal, such as new parents or those recovering from health issues.

What they did

The City raised awareness of the newly-launched program through a wide range of media and encouraged champions to come forward at the neighbourhood level. Program information was placed in the City's customer service centre, seniors centres, libraries, and recreation centres. The following are examples of program communications:

- CTV News Story
- Global News Story

What they learned

The MIX project and the Snow Angels Canada platform, as community and business collaborations, both demonstrate that challenge-based procurement can be an ideal response to issues requiring social innovation. The City can act as an effective facilitator and catalyst, bringing together strategic stakeholders, third-party service organizations, and social enterprises to address community needs.

Looking Ahead

Simalam Inc. launched the Snow Angels Canada platform in tandem with targeted communication support from the City of Barrie at the end of January 2020. There has been a strong response from volunteers to assist those in need, resulting in a 4:1 ratio of volunteers to clients. The City's customer service centre reports that the option to refer residents in need to the platform has improved the tone of conversations. As it looks ahead to Winter 2020/2021, the City will determine how much communications support is needed to ensure ongoing community awareness of and engagement in the Snow Angels Canada platform. Collaboration with the City has enabled Simalam Inc. to improve their social enterprise platform and promote it in other locations with an embed process already tried and tested in a snow belt community.

From March 2018 to May 2020, the City of Guelph partnered with the cities of London and Barrie and the MaRS Discovery District to develop, test, and share new methods of municipal procurement. It was called the MIX - the Municipal Innovation Exchange - and it also drew support from the Guelph Lab, Innovation Guelph, and the Brookfield Institute for Entrepreneurship & Innovation. "Innovation partnership" was their focus: how a municipality can seek out private or nonprofit entities to devise a solution to a complex municipal issue (the "challenge"), in partnership with the municipality itself. All the partners' insights and best practices in this regard have now been compiled in the MIX Challenge Toolkit.

London, Ontario

The Challenge

The extensive outdoor recreation system of the City of London includes over 400 parks, over 200 km of pathways, and such sports assets as 90 soccer fields and 80 baseball diamonds. Like most cities, London manages the operations and capital expenditures for the sports assets. One major responsibility is to schedule their usage by community leagues, for games and practices.

Current scheduling shows the baseball and soccer facilities are operating at over 95% capacity during "prime season," that is, weekends and evenings between May and October. Such a level of operations leaves little room for flexibility in scheduling and makes it difficult for users to hold their programs at preferred times.

The dilemma has led the City to consider investing in additional capital assets, which could involve the acquisition of land, or the conversion of publicly-owned land into sports facilities. Prior to making these investments, however, the City wants to confirm that operating levels are indeed higher than 90%. To date, the best data about asset usage has been based on the scheduling system. Might there be a better way to gauge how these facilities are being used, when, and by whom?

The issue bears some resemblance to road and traffic analysis, a specialty of Numina CTY. Inc, in Brooklyn, New York. To that end, Numina had developed a technology that distinguishes between different types of users of city streets and sidewalks. In 2019, as part of the Municipal Innovation Exchange (MIX) program, the City of London selected Numina as a partner to see if this technology could be applied to detecting not only user types, but the activity of the users, and in sports facilities.

The City of London (above) is situated in the heart of south-western Ontario, between the Windsor/Detroit border and the Greater Toronto Area. With a population of 380,000, London is the economic, healthcare, and educational hub of the region. Londoners take great pride in the extensive network of recreation amenities, parks, and pathways available in their "Forest City."

Numina CTY, Inc. is a tech company, operating out of Brooklyn, New York. It has created sensors that use onboard computing to pre-process and then erase imagery relating to all kinds of curb-level activity by both travelers and vehicles. The same systems then deliver volume counts, paths, and traffic behaviours in datasets that are anonymous and secure.

Photo courtesy of Sportball Ltd.

The embed process between the City of London and Numina started in October, 2019 – not prime season, unfortunately, so testing the technology on outdoor sports assets was not feasible. The decision was made to redirect the project to analyze the usage of the outdoor trails system instead, an amenity well-used year round, and maintained over the winter. Previously, data on trail usage came in the form of people counters, to track volume. Numina's technology would enhance the volume counts by detecting different user groups, such as cyclists, dog walkers, and the use of mobility devices. After obtaining sufficient proof of concept, the City of London and Numina agreed to continue their relationship and adapt the developed algorithms to the original target, sports fields.

What they did

As a project partner rather than a simple vendor, Numina supported this "pivot" in the direction of the trails system. The task would be similar in nature to their existing object identifier tracking, yet allow them to develop identifier algorithms for outdoor amenities. Numina installed several sensor devices along pathways, and engineered new identifiers for bicycles, dog walkers, and mobility devices, such as wheelchairs. The data was anonymized at source and reported back to the City on an easy-to-read dashboard with metrics, heat maps, and time-of-day analysis.

What they learned

The work with the MIX project and with Numina has added new variables for describing the usage of the City's trails systems. The impact of such factors as weather, time of day, and day of the week can now be detected. It has become clear that, even on simple tracking programs, decisions about artificial intelligence (AI) technologies, data storage, and the movement of data are important considerations.

As the next phase of the relationship commences, and the project's focus returns to sports assets, the partners can repeat and improve on the experimental process, and thereby ensure that all implementation criteria are met.

Looking Ahead

Numina has been able to provide the City of London with proof of concept that the technology can reliably detect such specific users as commuters, dog walkers, and those using mobility devices. The City and Numina now look forward to prime season, when they can track the usage of sports assets. The goal of the analysis is to determine if actual usage (such as scheduled practices or games) matches the usage indicated by the City's booking system. It will also indicate if there is any remaining capacity on the City's sports assets, or if a decision has to be made to increase the inventory of those assets.

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Guelph, Ontario

The Challenge

Like any city, Guelph has to make difficult decisions about when and how to repair infrastructure. The City already exceeds provincial standards by inspecting almost daily its 500 kms of roads for potholes. It does a thorough assessment of the road network every three years. But by 2019, the question had arisen: could the City base its maintenance on even more frequent and comprehensive data concerning road conditions?

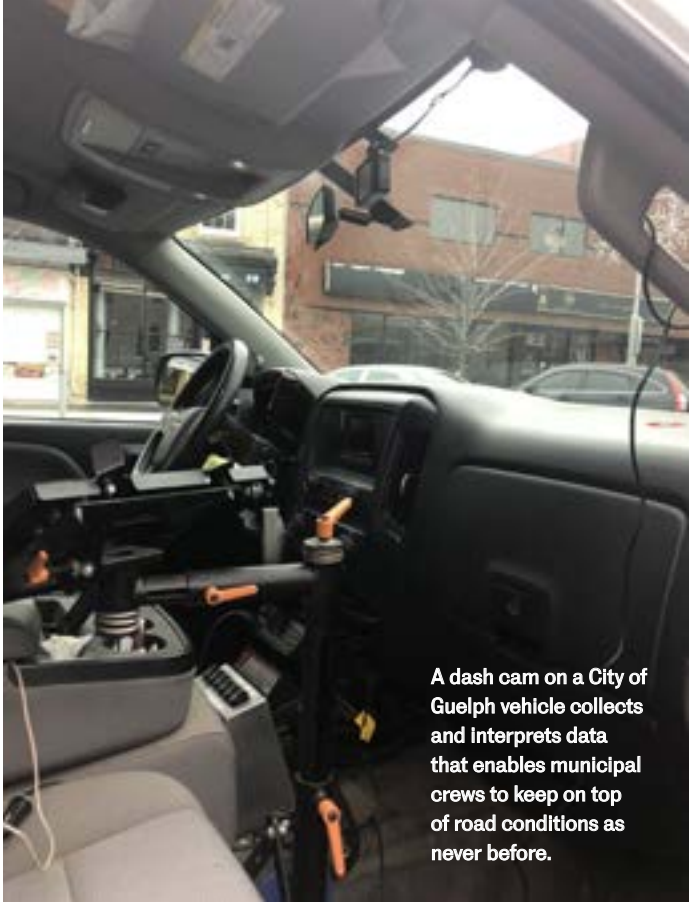
A 2019 satisfaction survey indicated that road maintenance was the number one concern for Guelph residents. Road maintenance crews are out filling potholes daily. Each year some roads need to be completely resurfaced and must be fully replaced.

The City's Asset Management team supports each maintenance program with information about road conditions. These are multimillion-dollar decisions. As the road network ages, however, and as road-damaging freeze-thaw weather events become more frequent, road maintenance decisions get tougher.

The City used its Civic Accelerator program to reach out for potential solutions. The Accelerator invites innovative companies to work hand-in-hand with City staff to solve municipal challenges. In 2019, IRIS R&D Group was one of a number of Accelerator applicants with a strategy targeting road maintenance. Its impressive iPORT™ technology could use dashboard cameras and artificial intelligence (AI) to identify potholes and road debris. Moreover, any trace of personal information collected by the cameras could be eliminated. The City selected IRIS and together they worked to explore whether iPORT™ could generate a higher frequency of data on overall road conditions and maximize the value of the City's road maintenance program.

The City of Guelph (*above*) is a vibrant community of over 140,000 people situated in the heart of southern Ontario, just 100 km west of Toronto, Ontario, Canada. It is home to the Civic Accelerator, one of Canada's pioneer innovation procurement programs.

IRIS R&D Group Inc. is an Ontario company whose business model harmonizes AI technology with issues of citizens' rights to privacy. IRIS's iPORT ™ Dash cam deploys AI technology to detect road deficiencies and collect practical data in order to prioritize municipal work without compromising public privacy.



A dash cam on a City of Guelph vehicle collects and interprets data that enables municipal crews to keep on top of road conditions as never before.

In January 2020 the City of Guelph and IRIS agreed to extend their partnership. The results of the first four months of collaboration showed promise. It looked like the City could increase the frequency of data concerning road conditions; the dashcam could be mounted on existing City vehicles; and anonymizing the video stream afforded adequate protection to public privacy. Demonstrably, it is possible to gather real-time data on road conditions. The next phase in the partnership will clarify the actual value of this real-time data.

What they did

Embracing the spirit of experimentation, the City and IRIS created practical work-arounds for mounting cameras on City vehicles and for sharing video data with IRIS. Video collected from City vehicles was used to train the AI system to identify road defects. After the data collection, IRIS demonstrated prototypes of a user-interface: a map that displays road defects, images, and overall road conditions.

What they learned

The project generated valuable lessons about the privacy implications of AI technologies, as well as ways to store and anonymize data without jeopardizing public privacy. Process mapping early in the project also helped to clarify where this innovation could add most value for the City. The project initially focused on decisions about major infrastructure projects (road replacements). Its next phase will explore additional issues: how this innovation could be applied to the resurfacing program; how it could provide useful resident-facing information; and how it might clarify the long-term implications of climate change and severe weather events on road conditions.

Looking Ahead

IRIS has been able to validate existing and emerging elements of its business model, and has gained a better understanding of City processes. The City has been able to delve into the capabilities of emerging AI technology and navigate the questions it raises about public privacy. In the next phase of their partnership, the City and IRIS plan to gather more data to train the AI system. They want to acquire the ability to generate Pavement Condition Index (PCI) scores, which are vital to assessing the overall condition of a road. They also plan to test the innovation more widely. It has the potential to benefit a number of City programs, and the City is excited to be part of the discovery process as well as the possible results.

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